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BY

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April 28, 1910.—At 3.50 a.m., I saw Halley's Comet for the first time with the naked eye. This was a welcome sight after two months of comet-hunting in the winter mornings. Undue expectations had been fostered by the barrellfuls of printer's ink shed by the newspapers in the cause of sensational astronomy. A clear, cold morning; the moon shining brightly; Venus as the morning star. Halley is to our left from Venus and higher up in the sky. It showed a tail of three or four degrees in length to my sight, and remained visible until about 4.20 a.m. when the dawn made it difficult to see. A week ago the comet was not visible to the naked eye, as on April 22 I looked for it without success. Since that time the sky has been cloudy every morning. Its tail spreads more widely than that of any comet I have seen, except, perhaps, that of 1882. The head of Halley's Comet is of about the 3rd magnitude. (My estimate of the length of its tail on this its first appearance agrees with the estimate made at Harvard University, as given in *Science* of May 6, 1910, viz. 4 degrees on the morning of April 27, on which day it was seen in the Eastern States, but not in this part of Canada until the following morning, owing to clouds).

April 29 and 30.—Cloudy mornings.

May 1.—Observed Halley's Comet again at 3.40 a.m. By 4.05 a.m. the dawn began to obliterate the tail. Its position was about the same as on April 28. The comet was appreciably larger than three days ago, and its tail longer. To my eyesight the tail did not expand so much as on April 28, but the increase in its length would give this impression. May 1 is said to be the date of conjunction between Venus and Halley's Comet. If so, and their distances from us about equal, then Halley's head does

not appear to have much more than half the diameter of Venus, comparing them as they appear this morning.

May 2.—At 3.55 a.m. Halley's Comet is dimly visible through the hazy atmosphere. Its tail has a length of about 6 degrees.

May 3.—Cloudy morning.

May 4.—At 3.25 a.m. the comet is quite plain. At 3.40 a.m. its tail has a visible length of about 14 degrees, having increased rapidly since the 2nd. The nucleus is increasing in size also. Its position is about the same as on April 28, when I first observed it.

May 5.—Another clear morning with the comet in full view. At 3.15 a.m. it is all quite visible, its tail extending further backward than yesterday morning. As dawn advances at 3.45 a.m. the tail shortens. The head lacks the brilliancy it had when I first saw it on April 28, but is larger. This decrease in brightness may be due to its acquiring a half-moon appearance like Venus or the moon in one of their phases, instead of the full face it had when in a more distant position from us. Its position among the stars seems to be the same as at first.

May 6.—Another clear morning and the comet in full view. Its head has still further lost its former brilliance, but appears to be larger. At 3.30 a.m. its tail extends for 30 degrees, but already toward the end of it the dawn begins to obliterate it, and at 4 a.m. it is quite faint.

May 7.—At 3.45 a.m. the comet is dimly visible through the haze. The position of its head has slightly altered to the left of its former position, this being the first time any appreciable change could be noticed.

May 8.—The atmosphere is too hazy to show the comet this morning, yet at 3.45 a.m. I thought I could see it faintly through the haze.

May 9.—At 3.15 a.m. the comet is already visible. Its tail does not seem to exceed the 30 degrees formerly reached. The

position of its head is slightly to the left, and a trifle (about half a degree) higher in the sky at 4 a.m. than formerly, but otherwise it has remained in almost the same place in the sky for nearly two weeks. The dawn begins to obliterate the tail now at 3.30 a.m. Halley's Comet now appears as large as that of 1882, but the twilight is longer, which makes it more dim than that of 1882. The tail appears broader than formerly, and the head larger, but the latter has not the sparkling brightness it had at the first.

May 10.—At 3.35 a.m. the sky is somewhat cloudy, but Halley's Comet is discernible among the stars, faintly.

May 11.—Cloudy morning.

May 12.—A clear sky at 3.30 a.m. and the comet in full view. It has moved perceptibly to the left of its former position. The tail is broader, but its length at 3.30 a.m. has been diminished by the dawn. Half an hour ago it was portentous. The head is still less in size than Venus, which has risen.

May 13 and 14.—Cloudy mornings.

May 15.—A clear morning and Halley's Comet in view. At 2 a.m. the tail is well above the horizon and is traceable as a dim light something like the Zodiacal Light in February. At this hour there is no sign of the dawn. I did not get a sight of the head of the comet above the horizon, although I watched continuously for it until 3.40 a.m., but by this time the tail was quite destroyed by the advance of the dawn. At 2 a.m. and at 2.30 a.m., however, I noted the star to which the tail extended, and on the head appearing, I measured the angle made by the whole comet as 65 degrees, the star being still visible notwithstanding the dawn. While the tail shone at full length at 2 a.m. and 2.30 a.m. the last six or eight degrees at its extreme end consisted of diffused light, but it was easily discernible as part of the comet's tail. The head of the comet this morning had a nebulous appearance, and the nucleus was dim, (which was, perhaps, not altogether due to the approach of dawn), but altogether the head is

larger than before. At 2.30 a.m. there was a distinct aurora in the north, and a day or two ago I noticed a similar phenomenon at about this same hour. This morning also I noticed three "shooting stars" in the neighborhood of the comet's position about 2.30 a.m. at intervals of a few minutes apart. There is no streaking in the comet's tail except, perhaps, just at the head, the entire tail being a mere sheet of light like the Zodiacal Light or the Milky Way. My mother, who witnessed Halley's Comet this morning and also Donati's Comet in 1858, states that the tail of Donati's spread out more widely than that of Halley's this morning, and was more distinct in the darker autumn sky. The tail of Halley's this morning passed through the same point or nearly the same that it has held since April 28, but the head has extended forward and the tail further backward. It would thus appear that the earth in its course will pass through the tail. Venus had risen before I could see the comet's head this morning. My measurement of 65 degrees was made by the boat-and-string method, and a divided circle, which gives a very close estimate.

May 16.—At 1.30 a.m. the tail of Halley's Comet is already coming into view. At 3 a.m. when the chief part of it has risen, it is seen to extend distinctly three or four degrees further backward than yesterday morning. Toward the end the width of the tail does not exceed three degrees, including even its diffuse edges. I did not get a sight of the head until 4.10 a.m., although it was then risen some little distance, but the haze on the horizon had obscured it. By taking two landmarks I noted the exact position of the comet's head at 4.10 a.m. Exactly an hour later the sun rose, and I measured the sun's position on rising. Allowing 15 degrees for the distance traversed by either one during the hour, I found the head of the comet to be approximately 25 degrees from the sun, by this method. Stars could be seen shining through the tail of the comet, which continues to be merely a sheet of light.

May 17.—At 2.30 a.m. the comet's tail is in view. It has about the same width toward its end as yesterday morning, or,

perhaps, is a trifle wider (nearly 5 degrees) although its edges are more diffuse and more difficult to estimate. In brightness the tail scarcely equals the Milky Way, which is nearly in the zenith and in good position for making a comparison between the two. But the tail seems to fluctuate in brightness about every five minutes, sometimes becoming more illuminated than at other times. The tail can be traced almost to the Milky Way this morning, having extended beyond its former position. From the end of the tail to a prominent star about midway along its length, I found the span to be 47 degrees, and when I sighted the head at 4.25 a.m. the span from the star to the head was approximately the same, viz., 47 degrees, making a total length for the comet this morning of 94 degrees. The head was very dim this morning, the dawn well nigh obliterating it, yet I was able to see it for a brief period. It has moved through an angle of 12 degrees since yesterday morning, according to my method of measurement by means of landmarks; the mark of yesterday morning having been permanently fixed for this purpose. This apparently indicates that it will reach the sun and that the transit will occur before the computed time of 2.52 a.m. on May 19 (Greenwich time) as announced in the newspapers. Yesterday morning (the 16th) the most intense part of the tail was distinctly in the upper or northern portion of it; but this morning (the 17th) this massing of the light to one side was not so conspicuous.

May 18.—At 2 a.m. and at 3 a.m. the sky continued cloudy and there was no chance to see any portion of the comet, even if it had been visible. At 4 a.m., the sky having cleared somewhat, there was too much twilight to see any part of it, if still visible in the east. But in the zenith, and for short distances north and south of the zenith, the sky had a purplish tint of an unusual kind,—a faint glow or illumination in the higher parts of the atmosphere, such as one sees on rare occasions before or during a very strong display of aurora. There had been a heavy rain at 1.30 a.m. which cleared the air, and the purple color or glow was not due to cloudiness or haze, the stars being distinctly

visible through the color. Clouds again covered the sun at sunrise and all day (17th) until 5 p.m., during which period the transit may have occurred, as from 5 p.m. until sunset no dark nor even translucent object crossed the sun's disk. At about 10.30 p.m. to-day (18th) a display of aurora occurred and was visible here; but as this is about the usual time of the day for the maximum auroral action, I do not consider it is as directly evidence of the comet's action as the colored illumination in the morning. Yet I believe the auroræ that have been common for a week past have been due to the proximity of Halley's Comet to the earth.

May 19.—There was complete absence of any glow in the zenith such as I observed yesterday morning at 4 a.m.

May 20.—Clouds in the evening obscured the western sky making any observation impossible.

May 21.—At 8.40 p.m. I obtained a sight of Halley's Comet in the western sky for the first time. Its position is about 2 degrees east of Procyon and about 25 degrees from the horizon where the sun set. As the sun is now 15 degrees beyond the horizon, (an hour having elapsed since sunset), the comet is, therefore, 40 degrees from the sun, and has travelled approximately 53 degrees since the 17th at 4.25 a.m. Making some allowance for atmospheric refraction near the horizon, such as might enter into the measurements I have made, this estimate appears to afford a second proof that the transit of the comet across the sun or near it occurred during the part of the 18th while the sun was beclouded. To-night (the 21st) the head of the comet is large but very foggy in appearance the same as on the mornings of the 16th and 17th, but the tail is not conspicuous owing to thin clouds and moonlight. There is a greater coma around the nucleus than when I first saw the comet on April 28, and the tail seems to spread out more fan-like than before it crossed the sun, but is shorter, apparently. By about 9.30 p.m. clouds obscured it.

May 22.—Cloudy evening.

May 23.—At 9 p.m. the comet is visible at times through the rifts in the clouds. It is more distinct than on the 21st, and its position better for observation, although the full moon in the east lessens the light of the tail. There is less foggiess about the head than on the 21st.

May 24.—At 9 p.m. the comet is in view but there is a hazy atmosphere, and I cannot distinguish the tail for more than 5 degrees.

May 25.—At 9.30 p.m. there is a good view of the comet with a clear sky and cool air. The tail extends for about 30 degrees distinctly and dimly for 5 degrees further. Toward its end it has a width of about 3 degrees. The head is disk-like, as it appears to-night.

May 26.—Cloudy night.

May 27.—At 9.30 p.m. the comet is in full view, but is becoming noticeably smaller, as it must naturally become, seeing the earth and itself have been receding from each other almost directly since the transit on May 18. The light of the comet continues to be of a whitish color, and has been uniformly of this color since the first appearance. To my eyesight the light of its tail fluctuates slightly in its intensity, somewhat like the streamers of aurora but much more slowly and more feebly, less perceptibly, yet enough to detect with the naked eye.

May 28.—At 9.30 p.m. the comet is visible for a short time during a break in the clouds. It is becoming still smaller, and its position among the stars is now changing only slightly. Slow changes in the intensity of the light of its tail are still apparent to me.

June 3.—Owing to lengthened twilight and decrease in size, the comet did not come into view until nearly 10 p.m. Almost a week has expired since it was last visible, cloudy nights having intervened. It is now much smaller, the tail not exceeding 20 degrees in length, and the head also minute.

Altogether, as a spectacle, Halley's Comet has been a feeblener one than most people expected, but this has been chiefly owing to our long twilight at this season in northern latitudes. Nearer the equator the view, perhaps, has been better than ours. But the sensational balderdash of the daily newspapers had aroused undue expectations. And it is a pity that wild statements regarding the loss of its tail in March, the cyanogen gas, and the curvature of the tail, etc., should get credence in our reputable scientific journals like the *Scientific American* and be placed on record for the future. When it was on the other side of the sun, in March and during the early part of April, its tail may have been inappreciable to observers with telescopes, being turned directly from the sun and from ourselves. And at no time have I observed the slightest curvature in its tail, such as has been imagined by some, but not witnessed by anyone. Light passing along the full length of the tail say of 20,000,000 miles would traverse the entire course in something less than two minutes, and during that short time the distance travelled by the head of the comet would be too inappreciable to cause any curvature to be visible to the eye.

BARRIE, ONT.